REMARKS/ARGUMENTS

In response to the Office Action mailed July 26, 2005, Applicants amend their application and request reconsideration. In this Amendment claims 3, 13, 23-25, 29, 30, and 32-37 are newly canceled. Accordingly, upon entry of this Amendment claims 2, 4, 5, 7-12, 14-19, and 26-28 remain pending.

With respect, Applicants found the Office Action that was mailed July 26, 2005 exceedingly difficult to follow. Although the recitation of the claims then pending correctly appeared in the PTOL-326 Form, very different comments appeared in the Official Action. Comments concerning previously canceled claims were repeated and there was some confusion concerning the basis of rejection of certain claims. An attempt has been made to determine the intended rejections and to respond to those rejections in this Amendment. Applicants respectfully request that any further Office Action not be simply a repetition of the previous Office Action but that any repeated comments be appropriately edited to reflect the claims now pending and their respective rejections.

Information Disclosure Statement

An Information Disclosure Statement was filed with the application on February 7, 2001. That Information Disclosure Statement cited two documents. The first document is a Japanese published patent application of which the Examiner acknowledged consideration of only the Abstract, and the second document was a document from the worldwide web. The Examiner refused to consider the second document and demanded to know its origin. The origin was provided in the previous response so that the Examiner should now consider that publication. The assertion that the Examiner is excused from considering that publication stated at pages 2 and 3 of the Office Action should be reconsidered and withdrawn in view of the identification of the origin of the document in the previous response.

The lengthy commentary appearing at pages 3 and 4 of the Office Action concerning the Japanese language document is noted. The discussion does not appear relevant to any issue in the prosecution of this patent application.

This Amendment

The amendments to the claims in this Response must be individually considered. However, for the benefit of the Examiner, the general purpose of the amendments made is explained. Former claims 2 and 3 are combined as amended claim 2. The residual references to a "universal-computer" are amended to remove "universal". The claims no longer refer to "an acceleration unit" but rather specify in its place "at least one cache" as described in the patent application at page 29, lines 23-25. As pointed out on page 30 of the patent application, the acceleration unit according to the described embodiment includes multiple

caches. Certain claims now refer to the optimization filtering unit as recombining the logical operations, consistent with the disclosure of the patent application from page 48, line 21 through page 49, line 6.

Claim Objections

The claims objected to are no longer pending.

Formality Rejections

The word "universal" no longer appears in any claim, overcoming the rejection with regard to claims 12-19, 27, and 28. The other cited claims are no longer pending.

Prior Art Rejections

As best understood, the outstanding prior art rejections with regard to the claims presented here, considering the combination of claims 2 and 3, is as follows.

Claims 4, 5, 7-9, 11, 12, 14-16, 18, 26, and 27 are rejected as anticipated by an article by Kim.

Claims 2 and 10 are rejected as obvious over Kim in view of a book by Aho.

Claims 4 and 11 are rejected as unpatentable over Kim in view of a book by Chester.

Claims 12, 14-16, and 27 are rejected as unpatentable over Kim in view of McGrath et al. (U. S. Patent 5,504,902, hereinafter McGrath).

Claim 17 is rejected as unpatentable over Kim in view of McGrath and further in view of Aho.

Claim 18 is rejected as unpatentable over Kim in view of McGrath and further in view of Chester.

Claims 19 and 28 are rejected as unpatentable over Kim in view of McGrath and further in view of an article by Rosenberg.

Reply to Prior Art Rejections

Amended claim 2 describes a control-program-development supporting apparatus comprising a compiler producing a control program directly executable by a microprocessor, and an optimization filtering unit formerly described in claim 3. The optimization filtering unit of amended claim 2, unlike the optimization filtering unit of examined claim 3, also provides for recombining logical operations. The optimization filtering unit permits the production of a compact and optimum execution code by reconstituting codes with the optimization filter before inputting a control program, such as an instruction list, to the compiler. To be specific, the control program is optimized before the control program is converted into a programming language and, consequently, the execution efficiency of the

execution code is improved after the compiling as described at page 48, lines 8-14 and page 49, lines 4-6 of the patent application.

Kim describes a method of translating a ladder diagram (LD) into a native code of a processor. The method includes three steps, one in an LD/mnemonic converter, another in a macro compiler, and a third in an assembler. In the LD/mnemonic converter, an LD application program is converted to a program that consists of LD mnemonics which are not described by Kim. Then, the macro compiler translates each mnemonic into an assembly code block specific to the main processor, equivalent to the processor 101 in Figure 11 of the present patent application. Finally, the assembler generates an executable binary code like the C-language compiler 102 in Figure 11 of the present patent application. The assembler reduces both the size of the memory required and the translation time needed according to Kim. Thus, the execution code is optimized when the programming language is converted into execution code.

Aho only describes well known compiler optimization techniques, such as redundancy elimination in Section 9.9 and 10.2. However, even if Aho is employed to modify Kim, the combination does not describe the optimization filtering unit of claim 2 so that *prima facie* obviousness of that claim cannot be established from the proposed combination.

Amended claim 4 not only includes the contents of examined claim 2 but also describes the processing-time rough-estimating unit which determines and selects a sample program that is most similar to the control program to estimate processing time of the control program. Because it is difficult to estimate the processing time to produce an executable code generated by compiling, the processing-time rough-estimating unit selects a sample program having a known processing time and that is most similar to the control program. Based on that selection and the processing time of selected sample program, the processing time of a generated control program is estimated as described in the patent application at page 50, lines 7-12.

Kim merely discloses an actual measurement result of processing time using a control program in the description that appears at pages 4 and 5 of Kim. There is no estimate of the processing time as in claim 4. Chester only estimates a relationship between a monthly payment and a loan balance in the description at pages 114-117. Kim clearly cannot anticipate amended claim 4 because Kim does not describe estimating processing time by any means. Kim as modified by Chester likewise fails to suggest claim 4 because the estimation provided in Chester and relied upon in the rejection is unrelated to the processing time estimation according to claim 4. Neither anticipation nor *prima facie* obviousness of claim 4 has been established.

The control-program-development supporting apparatus according to claim 5 includes a control-program dividing unit that, as described in the patent application, divides a control program that is described either in a sequential-processing language, such as an LD, or an instruction list that is conventionally handled as a single program file, into a plurality of divided programs. For example, Figure 3 of the patent application describes such divided programs 3-1 to 3N that are prepared in accordance with a division algorithm. In the case of the LD, instructions collected from input to output are described as one block that is referred to as a rung. The rung dividing method divides a control program at a gap between rungs of the LD. By dividing the control program at a gap between rungs, an arrangement of devices with respect to a register can be efficiently employed to control the deterioration that results from the division. This process and its advantages are described in the patent application at page 33, line 18-25, page 35, line 5-7, and from page 35, line 23 to page 36, line 3. Because one rung is a minimum unit of a block that is controllable, the blocks that comprise a plurality of rungs are also controllable. The generation of these controllable blocks by the control-program dividing unit is expressly described in amended claim 5.

Claim 5 cannot be anticipated by Kim because Kim merely discloses that an LD block is a partial combination of an order, rather than being a workable part of a ladder program. See Figure 4 of Kim. According to Kim, each LD block is divided into a plurality of logic units such as "AND" and "LOAD". See pages 2-4 of Kim. Thus, Kim does not disclose the control-program dividing unit of amended claim 5. Upon reconsideration, the rejection should be withdrawn.

Claims 7-9 all depend directly from claim 5 and were rejected on the same basis that claim 5 was rejected, namely anticipation by Kim. If claim 5 is not anticipated by Kim, it follows that none of claims 7-9 can be anticipated by Kim.

Further, with respect to claim 8, Kim never discloses dividing a control program into a plurality of controllable blocks at a rung serving as a jump destination for a jump instruction in the LD to generate a program file for every controllable block. On this additional ground, the rejection of claim 8 should be withdrawn.

Dependent claim 9 provides a further distinction from Kim because Kim does not disclose that the control-program dividing unit extracts at least some rungs, including instructions to a common input or output device, from the LD with at least some of the rungs extracted constituting a single controllable block.

Claim 10 depends from claim 5 and has been amended to add, as part of the operation of the optimization filtering unit recombining logical operations in accordance with the description at pages 48 and 49 of the patent application. The rejection of claim 10 is founded upon the alleged anticipation of claim 5 by Kim. As described above, that rejection cannot properly be maintained so that the rejection of claim 10 should likewise be withdrawn.

Claim 11 also depends from claim 5 and is patentable over the asserted combination of Kim and Chester for two independent reasons. First, the rejection is founded upon the assertion that claim 5 is anticipated by Kim, an assertion that cannot be properly maintained. Second, as described with respect to claim 4, neither Kim nor Chester estimates processing time by selecting the sample program that is most similar to the control program and referring to the processing time of that sample program. The rejection of claim 11 should be withdrawn.

Claim 12 is an independent claim that includes all of the limitations of claim 5 and, in addition, a control-program converting unit. Claim 12 was rejected as unpatentable over Kim in view of McGrath with McGrath being cited as meeting the control-program converting unit of claim 12, the part of claim 12 not appearing in claim 5. Kim was relied upon as describing all of the elements of claim 12 that are common to claim 5. However, for the reasons supplied above, Kim does not anticipate claim 5. Therefore, even if Kim were modified by McGrath and McGrath did supply the control-program converting unit of claim 12, *prima facie* obviousness would not be established because Kim does not supply all the elements of claim 12 that are also present in claim 5. Accordingly, further discussion of the rejection of claim 12 and of its dependent claims 14-16, which were commonly rejected with claim 12, is not necessary.

The limitation of claim 14 is identical to the limitation of claim 7. Therefore, for the additional reason presented above with regard to the distinction between the limitation of claim 7 and Kim, claim 14 is further patentable over the asserted combination of Kim and McGrath.

The limitation of claim 15 is identical to the limitation of claim 8. Therefore, for the additional reason presented above with regard to the distinction between the limitation of claim 8 and Kim, claim 15 is further patentable over the asserted combination of Kim and McGrath.

The limitation of claim 16 is identical to the limitation of claim 9. Therefore, for the additional reason presented above with regard to the distinction between the limitation of claim 9 and Kim, claim 16 is further patentable over the asserted combination of Kim and McGrath.

The limitation of claim 17 is identical to the limitation of claim 10. The limitation of each of those claims was asserted to be disclosed by Aho. Even making that assumption, claim 17 is patentable because claim 12, from which claim 17 depends, has been demonstrated to be patentable over the asserted combination of Kim and McGrath. Further, the optimization filtering unit of claims 2, 10, and 17 has, for the reasons presented with regard to the rejection of claim 2, not been found to be present in Kim. McGrath was not asserted to disclose that optimization filtering unit, particularly as amended. For each of

these reasons, separately considered, *prima facie* obviousness has not been established with regard to claim 17.

Claim 18, rejected on the same ground as claim 12, from which claim 18 depends, and further in view of Chester is patentable because *prima facie* obviousness has not been established for independent claim 12. Further, the limitation of claim 18 is identical to the limitation of claim 11, a limitation that was added to the end of claim 4. As discussed with regard to claim 4, none of the references cited makes a rough estimate of the processing time for the control-program-developmental supporting apparatus by selecting the sample program that is most similar to the control program and for which processing time is known. Thus, *prima facie* obviousness has not been established on any of these grounds with regard to claim 18.

Claim 19, an independent claim includes, unlike any claim discussed above, a debugging-code generating unit and a debugging executing unit. The debugging-code generating unit generates a debugging control program by inserting a line number into a part corresponding to each line, with respect to an instruction list in source code of the advanced-language control program. This insertion feature is described in the patent application at page 19, lines 8-12. Of particular importance is the connection of the instruction list with the source code.

The principal reference of the three references applied in combination in rejecting claim 19 is Rosenberg, which concerns debugging. Unlike the instruction list connection to the source code according to the invention, Rosenberg only describes mapping the original source code directly into an application's machine code that is executed within the debugger. In other words, the source code is connected with the execution code in Rosenberg as described at page 12 of that publication, unlike the connection of the instruction list with the source code as in claim 19.

The debugging executing unit according to the invention relates each line of the instruction list with the execution part of the advanced-language control program. Further, as described in the patent application and claimed, the debugging execution unit displays the line in step-executing the debugging control program. See page 19, lines 12-16 of the patent application. Again, Rosenberg merely describes directly mapping the original source code to the machine code that executes within the debugger. See page 12 of Rosenberg.

Of course, Kim and McGrath are also cited in rejecting claim 19 but there is no suggestion that either of those publications includes any disclosure relevant to the debugging feature of claim 19. As described above, the debugging-code generating unit and the debugging executing unit of claim 19 are clearly distinct from Rosenberg. Therefore, the rejection, upon reconsideration, should be withdrawn.
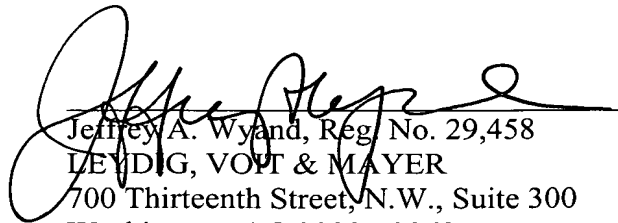
Claim 26, an independent claim, was rejected as anticipated by Kim. Claim 26 incorporates all of the limitations of claim 5 and includes further limitations. As discussed above, Kim cannot anticipate claim 5. For that reason, Kim cannot anticipate claim 26, a still more detailed claim. Applicants incorporate by reference the arguments previously presented against the rejection of claim 5 and make the same arguments with regard to the rejection of claim 26.

Claim 27 includes the limitations of claim 26 and additional limitations. Claim 27 was rejected not only as anticipated by Kim but also as obvious over Kim in view of McGrath. Just as Kim cannot anticipate claim 5 or claim 26, for the same reasons Kim cannot anticipate the more limited claim 27. Therefore, it is sufficient in responding to the rejection to again incorporate by reference and assert against the rejections of claim 27 the same arguments presented with regard to the rejection of claim 5.

Claim 28 includes, among other features, the debugging features of claim 19. Claim 28 was rejected on the same basis that claim 19 was rejected. Accordingly, for the reasons already supplied against the rejection of claim 19, applicants respectfully traverse the rejection of claim 28 and incorporate the arguments made in response to the rejection of claim 19 against the rejection of claim 28 without restating those arguments at length.

For the foregoing reasons, all the rejections are respectfully traversed. For the reasons supplied, and in view of the foregoing amendments, upon reconsideration, all rejections should be withdrawn and all of the remaining pending claims should be allowed.

Respectfully submitted,

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